Massachusetts Department of Environmental Protection

Source Water Assessment and Protection (SWAP) Report For Eastham Elementary School

What is SWAP?

The Source Water Assessment Program (SWAP), established under the federal Safe Drinking Water Act, requires every state to:

- Inventory land uses within the recharge areas of all public water supply sources;
- Assess the susceptibility of drinking water sources to contamination from these land uses; and
- Publicize the results to provide support for improved protection.

SWAP and Water Quality

Susceptibility of a drinking water source does *not* imply poor water quality. Actual water quality is best reflected by the results of regular water tests.

Water suppliers protect drinking water by monitoring for more than 100 chemicals, treating water supplies, and using source protection measures to ensure that safe water is delivered to the tap.

Prepared by the Massachusetts Department of Environmental Protection, Bureau of Resource Protection, Drinking Water Program

Date Prepared:
August 2004

Table 1: Public Water System (PWS) Information

PWS NAME	Eastham Elementary School
PWS Address	200 Schoolhouse Road
City/Town	Eastham, Massachusetts
PWS ID Number	4086002
Local Contact	Linda Burt, Certified Operator
Phone Number	508 225-0808

Well Name	*Source ID#*	*Zone I (in feet)*	*IWPA (in feet)*	*Source Susceptibility*
Well #2	4086002-02G	214	528	High
Well #3	4086002-03G	214	528	High

Introduction

We are all concerned about the quality of the water we drink. Drinking water wells may be threatened by many potential sources of contamination, including septic systems, road salting, and improper disposal of hazardous materials. Citizens and local officials can work together to better protect these drinking water sources.

Purpose of this report:
This report is a planning tool to support local and state efforts to improve water supply protection. By identifying land uses within water supply protection areas that may be potential sources of contamination the assessment helps focus protection efforts on appropriate best management practices (BMPs) and drinking water source protection measures. Department of Environmental Protection (DEP) staff are available to provide information about funding and other resources that may be available to your community.

This report includes:
1. Description of the Water System
2. Discussion of Land Uses within Protection Areas
3. Recommendations for Protection
4. Attachments, including a Map of the Protection Areas

1. Description of the Water System

Eastham Elementary School is a public water system that employs two (2) wells to serve the school's 390 students and staff. Well #2 is a 4-inch diameter well drilled to a depth of 31 feet. The well was approved by the Department in a letter dated April 14, 1994. Well #2 was installed due to elevated concentrations of nitrates in well #1 which has been abandoned as a public water supply source. Well #1 is currently used as an irrigation well. Well #3 is a 4-inch diameter well, drilled to a depth of 152 feet. The well was approved by the Department in a letter dated July 31, 2000. Well #3 was originally intended to replace Well #2 that had unacceptable levels of iron that severely complicated operation and maintenance of the distribution system. Well #3 also contained elevated levels of iron and was not able to fully replace Well #2 as the primary supply of potable water. The Department approved the use of the replacement well as an alternative source

What is a Protection Area?

A well's water supply protection area is the land around the well where protection activities should be focused. Each well has a Zone I protective radius and an Interim Wellhead Protection Area (IWPA).

- **The Zone I** is the area that should be owned or controlled by **the** water supplier and limited to water supply activities.
- **The IWPA** is the larger area that is likely to contribute water to the well.

In many instances the IWPA does not include the entire land area that could contribute water to the well. Therefore, the well may be susceptible to contamination from activities outside of the IWPA that are not identified in this report.

What is Susceptibility?

Susceptibility is a measure of a well's potential to become contaminated due to land uses and activities within the Zone I and Interim Wellhead Protection Area (IWPA).

for maintaining undisrupted service to the Eastham Elementary School. Based on the current Zone I of 214 feet and an Interim Wellhead Protection Area (IWPA) of 528 feet, the average daily withdrawal for the wells is limited to 5760 gallons per day. Please refer to the attached map of Zone I and IWPA. Well #2 and well #3 are located in a sand and gravel aquifer with a high vulnerability to contamination due to the absence of hydrogeologic barriers (i.e. clay) that can prevent contaminant migration.

The wells serving the facility are treated with sodium carbonate for corrosion control. Please contact the Public Water System contact person listed above in Table 1 for a copy of the most recent Consumer Confidence Report. Drinking water monitoring reporting data are also available on the web via EPA's Envirofacts website at: http://www.epa.gov/enviro/html/sdwis/sdwis_query.html.

2. Discussion of Land Uses in the Protection Areas

There are a number of land uses and activities within the drinking water supply protection areas that are potential sources of contamination.

Key issues include:

1. **inappropriate activities in Zone Is;**
2. **underground storage tank (UST);**
3. **septic system;**
4. **athletic fields; and**
5. **storm water.**

The overall ranking of susceptibility to contamination for the wells is High, based on the presence of at least one High threat land use or activity in the Zone I, as seen in Table 2.

1. **Zone Is –** Currently, the well does not meet DEP's requirements, which allow only water supply related activities in Zone Is. Well #2 and Well #3 Zone Is contain tennis courts and athletic fields. The majority of the Zone Is is undeveloped woodland. The public water supplier does own all land encompassed by the Zone I. Please note that systems not meeting DEP Zone I requirements must get DEP approval and address Zone I issues prior to increasing water use or modifying systems. Examples of modification or expansion include the addition of buildings, temporary or permanent, and increased water use due to an increase of staff and students.

Table 2: Table of Activities within the Water Supply Protection Areas

Potential Contaminant Sources	Zone I	IWPA	Threat	Comments
Underground Storage Tank	No	Well #2, #3	High	10,000 gallon fiberglass UST
Athletic Fields	Well #3	Well #2, #3	Moderate	Fertilizer and pesticide use
Residential	No	Well #2, #3	Moderate	Residents-septic systems, heating fuel storage, lawn care
Storm water from parking lot, driveways & roads	No	Well #2, #3	Moderate	Limit road salt usage and provide drainage away from wells
Septic System	No	Well #2, #3	Moderate	Refer to attachment on septic systems

*** -For more information on Contaminants of Concern associated with individual facility types and land uses please see the SWAP Draft Land Use / Associated Contaminants Matrix on DEP's website - www.state.ma.us/dep/brp/dws/.**

Glossary

Zone I: The area closest to a well; a 100 to 400 foot radius proportional to the well's pumping rate. To determine your Zone I radius, refer to the attached map.

IWPA: A 400-foot to ½ mile radius around a public water supply well proportional to its pumping rate; the area DEP recommends for protection in the absence of a defined Zone II. To determine IWPA radius, refer to the attached map.

Zone II: The primary recharge area defined by a hydrogeologic study.

Aquifer: An underground water-bearing layer of permeable material that will yield water in a usable quantity to a well.

Hydrogeologic Barrier: An underground layer of impermeable material that resists penetration by water.

Recharge Area: The surface area that contributes water to a well.

Recommendations:

- To the extent possible, remove all non-water supply activities from the Zone Is to comply with DEP's Zone I requirements.
- Do not use or store pesticides, fertilizers or road salt within the Zone I.

2. Underground Storage Tank - Within the IWPA, a 10,000 gallon fiberglass UST for heating fuel is located 400 feet east of the wells. According to school staff the tank was installed in 1989. If managed improperly, USTs can be a potential source of contamination due to leaks or spills of the chemicals they store.

Recommendations:

- The Department recommends that you inspect, maintain and replace or upgrade components of your heating system regularly. Inspect oil lines (i.e. furnace to tank) for corrosion or pitting and replace copper lines with lines encased in a protective sleeve or install UL listed oil safety valve to prevent leaks.
- During refilling of UST, ensure that the operator of the oil transport tanker does not leave the vehicle area while the UST is being filled.
- Consult with the local fire department for specific code requirements regarding your UST.
- Any modifications to the UST must be accomplished in a manner consistent with Massachusetts's plumbing, building, and fire code requirements.

3. Septic System - The septic system's leaching field is located approximately 225 feet east of the well and immediately west of the school buildings. The septic system is designed for 4440 gallons per day (July 9, 1987 plans). If a septic system fails or is not properly maintained it is a potential source of nutrients and microbial contamination. Improper disposal of household hazardous chemicals or industrial wastewater to the septic system is also a potential source of contamination to the water supply.

Recommendations:

- Septic system components should be located, inspected, and maintained on a regular basis. Refer to attachment for more information regarding septic systems.
- Educate students and staff about using cleaning compounds that are safe for the septic system, on proper disposal practices, i.e. only sanitary waste in the septic system. Staff should dispose of used oil, antifreeze, paints, and other household chemicals properly-not in septic systems. Information on septic systems can be found at the Mass. DEP web site http://www.state.ma.us/dep/brp/files/yoursyst.htm.
- Monitor water usage, as exceeding the septic system design capacity could cause premature failure of the septic system.

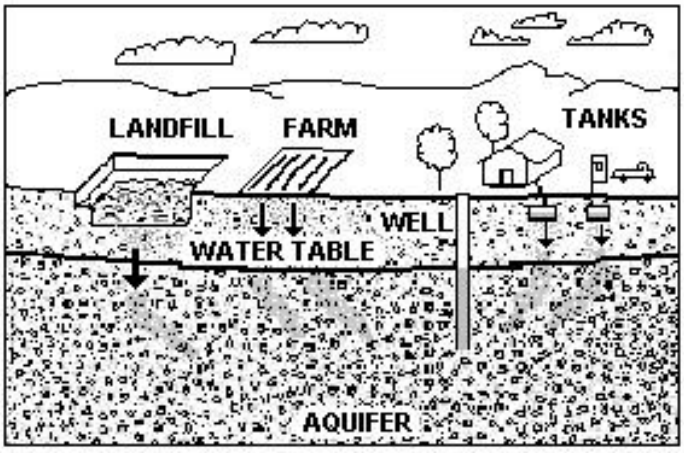

Figure 1: Example of how a well could become contaminated by different land uses and activities.

4. Athletic Fields - There are playing fields located within the Zone I and IWPA of Well #2 and Well #3. Over-application of pesticides and fertilizers on athletic fields is a potential source of contaminants to the water supply.

Recommendation:

- Use BMPs for applying, handling and storing of pesticides and fertilizers.

5. Storm water – Eastham Elementary School paved parking areas are located east and northeast of the Zone I for both wells. As flowing storm water travels, it picks up debris and contaminants from streets, parking areas and lawns. Common potential contaminants include lawn chemicals, pet waste, leakage from dumpsters, household hazardous waste, and contaminants from vehicle leaks, maintenance,

For More Information:

Contact Isabel Collins in DEP's Lakeville Office at (508) 946 - 2726 for more information and for assistance in improving current protection measures.

More information relating to drinking water and source protection is available on the Drinking Water Program web site at: www.state.ma.us/dep/brp/dws/

Additional Documents:

To help with source protection efforts, more information is available by request or online at www.state.ma.us/dep/brp/dws, including:

1. Water Supply Protection Guidance Materials such as model regulations, Best Management Practice information, and general water supply protection information.
2. MA DEP SWAP Strategy
3. Land Use Pollution Potential Matrix
4. Draft Land/Associated Contaminants Matrix

Copies of this assessment have been provided to the public water supplier, town boards, and the local media.

washing or accidents. Catch basins transport storm water from the roadway and adjacent properties to the ground.

Recommendations:

- Have catch basins inspected, maintained, and cleaned on a regular schedule.
- The Department recommends the public water supplier consider nonstructural techniques such as parking lot sweeping to reduce the amount of potential contaminants in storm water runoff. To learn more refer to the *Storm Water Management Handbook*, *Volume 1 and 2* for information on BMPs and documents available at http://www.state. ma.us/dep/brp/ww/wwpubs.htm.

Other activities noted during the assessment

Residential Land Use - If managed improperly, household hazardous waste, septic systems, lawn care, and pet waste can all contribute to groundwater contamination. Hazardous materials may include automotive wastes, paints, solvents, pesticides, fertilizers, and other substances. If a septic system fails or is not properly maintained, it could be a potential source of microbial contamination. Fertilizers and pesticides contain hazardous chemicals that can travel through the soil and contaminate ground water if over-applied. Pet waste may contain bacteria, parasites, or viruses that are a health risk. Water supplies may also be threatened from improper use and disposal of chemical products used in homes or businesses. Steps to educate residents and businesses on proper disposal of these materials is the best defense against pollution.

Implementing the following recommendations will reduce the system's susceptibility to contamination.

3. Protection Recommendations

Implementing protection measures and best management practices (BMPs) will reduce the wells' susceptibility to contamination. Eastham Elementary School is commended for its previous UST upgrade and its posting of drinking water signs. Eastham Elementary School should review and adopt the **key recommendations above** and the following:

Zone I:

- Keep non-water supply activities out of the Zone I.
- Consider well relocation if Zone I threats cannot be mitigated.
- Prohibit public access to the well pit for well #2 and well #3 by locking facilities, gating roads, and posting signs.

Training and Education:

- Train staff on proper hazardous material use, disposal, emergency response, and best management practices; include custodial staff, groundskeepers, certified operator, and food preparation staff. Post labels as appropriate on raw materials and hazardous waste.
- Work with your community to ensure that stormwater runoff from local roads is directed away from the well and is treated according to DEP guidance.

Facilities Management:

- Implement standard operating procedures regarding proper storage, use and disposal of hazardous materials. To learn more, see the hazardous materials guidance manual at www.state.ma.us/dep/bwp/dhm/dhmpubs.html.
- Ensure that hazardous materials are stored in contained areas where spills will not reach ground water or the septic system.

Planning:

- Work with local officials in Eastham to include the facility IWPA in Aquifer Protection District Bylaws and to assist you in improving protection.
- Have a plan to address short-term water shortages and long-term water demands. Keep the phone number of a bottled water company readily available.
- Supplement the SWAP assessment with additional local information and incorporate it into water supply educational efforts. Use a land use inventory to assist in setting priorities, focusing inspections, and creating educational activities.

These recommendations are only part of your ongoing local drinking water source protection. Citizens and community officials should use this SWAP report to spur discussion of local drinking water protection measures.

Funding:

Funding opportunities are described in "Grant and Loan Programs: Opportunities for Watershed Protection, Planning and Implementation" at http://www.state.ma.us/dep/brp/mf/files/glprgm.pdf.

4. Attachments

- Map of the Public Water Supply (PWS) Protection Area.
- Your Septic System brochure
- Residents Protect Drinking Water fact sheet